

Linking Risk Assessment of Marine Operations to Safety Management in Ports

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PROJECT DESCRIPTION

Problem Statement

As a consequence of the Sea Empress disaster in Milford Haven in 1988, the Port Marine Safety Code (PMSC) was introduced in the UK requiring all ports to carry out risk assessment of marine operations upon which the safety management system should be implemented. Deadline for implementation of the PMSC is the end of 2001.

Considering that ports are at the onset of safety regime utilized in other industries (e.g. Safety Report / Case regime), a suitable risk assessment methodology has been proposed which can easily be understood by all stakeholders in a port, [1].

This methodology has been inspired by increasingly obvious shortcomings in existing safety technology, which are demonstrated in lack of information transfer from hazard identification and risk assessment through to the safety management system. This means that a link between the technical system description (risk model) and the demonstration of working of the management system in the context of major hazards control is usually missing. This is not unusual because the methodologies for hazard analysis and risk assessment, in general, do not deal with complex technical and organizational systems in a unified manner. For example, the quantitative risk assessment (QRA) may take into account operator error in the causation part of the analysis, while it is rare to account for human factors in the escalation part, unless a specific operator action is intended to be a safety barrier. Even then, the quality of organization and management is not accounted for in the QRA; for example, to incorporate the “probability of partial malfunction of the emergency system” is hardly ever done.

Objective. In the proposed methodology, it is possible to include competency, personnel training, establishing operational constraints, supervision, communication and information exchange, etc. into the risk model. In this approach, the causation part of the incident is described by one or several incident causes, triggers or threats, and the barriers that are in place or could be put in place, to prevent the realization of hazard or decrease its likelihood. If barrier failure modes can be identified, then additional “secondary” barriers can be inserted to prevent these failures. If all barriers are breached and the incident is on the escalation path to different consequences, then recovery measures are put in incident escalation path to prevent further escalation and/or mitigate the

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consequence. In parallel, the tasks that port personnel have to carry out on a day-to-day basis (communication with the shipping, VTS service, pilotage, towage, lock operations, boatmen, cargo operations, dredging, maintenance, etc.) are identified, and linked to the risk controls. This forms the basis for an **integrated** safety management system.

PROGRESS TO DATE: This methodology² has been applied to 12 ports in the UK, and the first iteration risk analysis has been completed for the Forth Ports and the Port of Tyne, while the work on other ports is in progress. The meeting of Harbor Masters, port management, VTS operators, pilots, tug masters and other stakeholders with the risk consultant will be held in July to address comments on this approach and the first pass risk assessment report.

FUTURE PLANS

1. Maturing of methodology expected during application to other ports
2. Development of the safety management system supported by the described approach
3. Extend the application to the shipping industry
4. Monitoring the benefits of the approach in the ports where it was applied.
5. Modularising the approach so that it can easily be applicable to other ports; this means productising it and making it easily affordable to ports.
6. For benefits – see the attached paper.

PROPOSED PAPER

It is proposed to describe and comment on the following aspects of this approach:

1. Review of the methodology before application;
2. Initial hick-ups, and how was the full participation of the different stakeholder ensured;
3. How difficult was to establish the “systems” approach to marine operations, and identify the main safety critical tasks;
4. Several iterations of risk analysis and winning over the stakeholders;
5. “Final” risk model and linkage to safety tasks;
6. Development of risk acceptance criteria;
7. Initial risk assessment;
8. Problems with ranking of risk controls, and risk assessment of residual risks;
9. Real life examples and what it all means;
10. Review of the methodology after application;
11. Next step: the way towards an “integrated” safety of navigation management system (including emergency response plan).
12. Achievements!

REFERENCES

- [1] Enclosed paper

² The methodology has also been applied to a heavy transport vessel for a Dutch company.